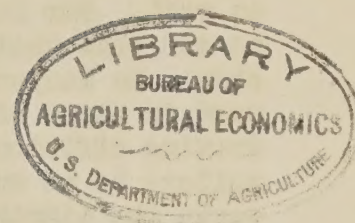


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UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Engineering



PREPARING COTTON GINS FOR THE COMMENCEMENT OF THE SEASON

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COTTON DIVISION COPY

In the November, 1934, issue of The Cotton Ginners Journal the care and maintenance of gins at the close of the season was discussed and an alphabetical list was given of some of the more important items demanding the final attention of the ginner. This list was not intended to be complete in all respects but was provided as an example for the individual ginner who wished to prepare his own tabulation.

At this time of the year we would make bold to suggest that a thorough and complete list of these items should be checked over as the first step in preparing for the approaching ginning season. Among the factors upon which the successful operation of the gin absolutely depends are (1) drives; (2) fans; (3) lubrication; (4) packing; and (5) piping. Some very good articles have appeared in the ginners' publications regarding the placing of power plants in good condition 1/ and the checking up of the outfit. 2/ The matter of fire hazards in the cotton industry has already been brought to the attention of the ginners in a recent article by Dr. David J. Price 3/.

The purpose of this article, on the other hand, is to consider the matter of drives, fans, lubrication, packing, and piping, which in our experience are worthy of serious attention on the part of the ginner.

DRIVES

It is needless to tell the ginner that the alignment and condition of his drives should be checked, but a ginner seldom asks himself how many of them he can dispense with and still operate satisfactorily. Frequently a change in pulleys and shafting will accomplish a surprising reduction in the number of belts.

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- 1/ "Getting the Power Plant in Good Condition" by Orville Adams, The Cotton and Cotton Oil News, January 19, 1935.
 - 2/ "Now is the Time to Check up the Outfit" by Orville Adams, The Cotton and Cotton Oil News, May 11, 1935.
 - 3/ "Fire Hazards of the Cotton Industry" by Dr. David J. Price, The Cotton and Cotton Oil News, June 1, 1935.

Flat belt drives, in general, are relatively easy to inspect and repair, but certain forms of these necessitate a checking of the pulleys as well. For instance, the belt distributor pulleys should be examined to see that their grooves are not worn away. Other flat belt drives should be inspected to ascertain whether or not endless belts cannot be used in place of lace belts, because of their general superiority in the driving efficiency. Care must be taken in the matter of flat belts and pulleys to be sure that the proper thickness of belting is chosen to serve the diameter of the pulleys, because too small a pulley diameter will often damage a thick belt by destructive bending or curvature.

It is well known that very successful drives on short centers are now being made with vee-belts, but it is not so generally known that in those drives which employ a large and a small pulley the large pulley need not necessarily be grooved. If the large pulley is 24 inches or more in diameter, its smooth face may be successfully used with vee-belts, provided the pulley does not have a crown. By this method the ginner may replace some of his former flat belt drives with endless vee-belts on closer centers, and at the same time economize by buying only the belts and the small grooved sheave for the drive. In connection with the subject of vee-belt drives, many engineers install their vee-belts so that the tight side is on top (just the reverse of flat belt practice), so that a small ball-bearing idler may be placed beneath the belts to conveniently take up any slack.

For vee-belt drives that do not transmit heavy loads, such as small conveyors for trash and the like, it has been observed that 90-degree drives and even crossed vee-belt drives are used with success. Multiple ropes were used on the 90-degree drives and only single ropes on the cross drives. Although this may appear somewhat revolutionary to the average operator, this form of drive has been giving good service when installed with proper care.

Some ginneries have several chain drives in their establishment, such as those between sections of long belt distributors, or on separators, or even on feeders and cleaners. These chains should be taken off, thoroughly washed and cleaned in a bucket of white gasoline, and then re-lubricated by slushing in good lubricating oil. In putting the chains back into position, care should be taken to see that too much tension is not placed in them. Chain manufacturers usually recommend that a link chain should have slightly more slack than a flat leather belt which is operating under good conditions. It is also advisable to place a simple dust guard or casing around such chain drives in cotton gins, and install a drop oiler for periodic lubrication.

FANS

The U.S. Cotton Ginning and Fiber Laboratories have repeatedly pointed out that the matter of fan speeds cannot be left to chance because of the excessive power consumption that results from unnecessarily high speeds. Each ginner should therefore check over his fan drives with a view to reducing the power costs to a minimum commensurate with good

operation. Serious vibration has frequently arisen in fans in which the wheels were not cleaned of adhering lint, or which were driven at high speeds without proper alignment and bearing maintenance. These should be attended to in overhauling the gin fans. The use of old rubber belting for lining the sheet-metal scrolls of some fans is well known to ginners, and offers an economical method of avoiding expense for new sheet-metal housings.

LUBRICATION

Lubrication of all gin machinery is vital to profitable operation and should begin with the engines or motors which furnish the power. The oil wells of all bearings should be examined, cleaned if necessary, and filled with suitable lubricating oils. If some bearings show that they have accumulated too much dust or grit, it is highly advisable to attach felt washers to the ends of the bearings in such a way as to assist in excluding destructive grit. In lubricating certain forms of ring-oiling fan bearings, small brushes are used in the lower part of the boxes, and these should be thoroughly cleaned or renewed in connection with the overhaul and lubrication of the fans. Fan lubrication is much more important than appears on the surface, because excessive use of the lubricant has been known to coat one or more fan blades and thereby accumulate heavy layers of dust and lint, which have thrown the fan out of balance, causing serious vibration and other damages if allowed to continue.

Ball bearings require lubrication according to their loads and speeds. The manufacturers of ball bearings have consequently issued pamphlets and instructions covering this subject. It may be said, however, that for speeds up to 1200 r.p.m. light lubricating oils may be used on ball bearings which have not to exceed 50-pound radial loads, and these same oils are suitable for 100-pound radial loads up to 600 r.p.m. For these loads at speeds exceeding those given, medium oils are generally recommended, although a good grade of No. 2 grease may be satisfactorily used wherever such light or medium oils are specified.

PACKING

12/3/35 MCB
The packing of the hydraulic ram for the bale press is so important that there is little excuse for a ginner to be caught unprepared and be thereby tied up with an exasperating delay in the middle of his first or second bale of the season. Faulty packing and serious oil leaks on press rams have developed some interesting examples of ingenuity on the part of the ginner which have introduced practices that are not advisable in continued use. For example, some ginners have resorted to rope in their packings and water for their hydraulic medium in order that the water might swell the rope and leather cups and thereby reduce the leakage. This is an interesting emergency repair, but the owner or operator of a cotton gin would better put his press into condition to use suitable petroleum oils without leakage as the polished surfaces of the ram will sooner or later be damaged by the continued use of water.

It has been observed at many gins that the presses have been allowed to get out of alignment so that the central members become cracked or broken when pressure is applied to the bale. In some instances, particularly with the older forms of steam trappers, breaking of the center post has threatened the lives of the operators. There have been too many accidents in the ginning industry accompanied by loss of life or limb, but with care in maintenance a ginner need not allow his press to become a menace.

PIPING

The piping of a cotton gin is so intimately related to its successful operation as to apparently need no comment, so far as the average ginner is concerned; but the question arises in this connection, as it does in the matter of drives, as to just how much equipment can be eliminated from a cotton gin without impairing its successful operation. Much thought is being given by the engineers of the ginning manufacturers to the question of the most economical velocities and volumes of air flow in the pneumatic piping of cotton gins, and a great many tests are being made by electric power companies and others in different States to assist their patrons in reducing operating loads. The piping to the inlets of over-sized fans, which are used for unloading, can, when being renewed, probably be made more efficient by entering the fans straight rather than with a diverging flare. The relation between the diameters of the inlet and of the wheel in fans is such that a smaller inlet for any fixed diameter of wheel tends to increase the efficiency of the fan. Leaky joints on the cotton-handling and air-blast-fan piping may be very cheaply repaired in some instances by the use of gummed manila paper similar to that commonly used by merchants in wrapping packages.

The lint flues of the gins should be cleaned and sanded to present smooth surfaces, and many gimmers believe that where possible it is advisable to shellac the interior surface of the lint flues to obtain real smoothness. In the passages of the Government design vertical drier, the same precautions of sanding and smoothing should be taken as in the lint flues of the gin, but it is not advisable to shellac these surfaces because the hot air may cause the shellac to become sticky. A check of the air pressures in the lint flues is desirable. The manufacturers of cotton ginning machinery usually recommend that the air pressure in lint flues shall not exceed 1/2 inch for brush gins and 3/4 inch for air blast gins, measured on water gages. If greater pressure than this exists, back-lash will probably result at one end or other of the gin.

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